Notice of Allowability	Application No.	Applicant(s)	
	10/743,840	MURPHY ET AL.	
	Examiner	Art Unit	
	Michael P. Stafira	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *amendment filed 8/11/2006*.

2. ☒ The allowed claim(s) is/are *1-20 and 23-36*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

Allowable Subject Matter

1. Claims 1-20, 23-36 are allowed over the prior art of record.

2. The following is an examiner's statement of reasons for allowance:

Regarding claim 1, the prior art fails to disclose or make obvious a part-on-mount method for determining the misalignment of a test part with respect to the spindle axis, and misalignment of a test part with respect to the spindle axis, and the misalignment of the spindle axis with respect to the wavefront-measuring gauge having the steps of determining the center of the circle with respect to the spindle to provide the gauge-to-spindle misalignment and determining the radius coordinates of the circle with respect the spindle to provide the spindle-to-part misalignment, and in combination with the other recited limitations of claim 1. Claims 2-8 are allowed by the virtue of dependency on the allowed claim 1.

Regarding claim 9, the prior art fails to disclose or make obvious a part-on-mount method for determining the misalignment of a test part with respect to the spindle axis, assuming that the gauge-to-spindle misalignment values are known having the steps of subtracting the assumed known gauge-to-spindle misalignment values from the tilt components to determine the spindle-to-part misalignments, and in combination with the other recited limitations of claim 9.

Regarding claim 10, the prior art fails to disclose or make obvious a method for employing an embedded gauge and test surface to determine geometrical constants of a mechanical positioning system including X, Y, and Z translational axes and A, B, and C rotational axes, wherein such constants may include lateral scale of the translational axes, spatial

separations between the rotary axes, and axial position of a gauge focus with respect to a machine stage, having the steps of performing a numerical fit to an analytical model of the machine geometry to provide the geometrical constants of the mechanical positioning system, and in combination with the other recited limitations of claim 10.

Regarding claim 11, the prior art fails to disclose or make obvious a method for aligning a wavefront-measuring gauge to a mechanical positioning system having a spindle axis having the steps of using said gauge to measure angular misalignment between said spindle (A) axis and said gauge; and e) re-orienting said gauge mainframe with respect to said mechanical positioning system, based on said angular misalignment measurement, to align said mainframe with said spindle axis, and in combination with the other recited limitations of claim 11. Claim 12 is allowed by the virtue of dependency on the allowed claim 11.

Regarding claim 13, the prior art fails to disclose or make obvious a method for calibrating and aligning a metrology system including a multi-axis mechanical positioning system and an embedded wavefront-measuring gauge to determine accurately the spatial relationships among the translational and rotational axes of the system having the steps of aligning said embedded gauge onto said A rotational axis; determining spatial offsets between said rotational axes when so aligned; and precisely aligning said machine rotational axes with said respective translational axes to set precise zero points for said rotational axes, and in combination with the other recited limitations of claim 13. Claims 14-19 are allowed by the virtue of dependency on the allowed claim 13.

Regarding claim 23, the prior art fails to disclose or make obvious a method for aligning the one rotational axis and said one translational axis by calculating the misalignment angle

between them having the steps of fitting a line to a plurality of gauge misalignment terms plotted versus position along the one translational axis; and calculating the misalignment angle of the one rotational axis from the one translational axis in the plane equal to the arctangent of the slope of the line fit, and in combination with the other recited limitations of claim 23. Claims 24-31 are allowed by the virtue of dependency on the allowed claim 23.

Regarding claim 32, the prior art fails to disclose or make obvious a method for aligning an interferometer aperture converter to a mechanical positioning system having a spindle axis having the steps of placing a corner cube having a measurable front surface on the spindle; using the interferometer to measure angular misalignment between the spindle axis and the interferometer with aperture converter attached; and re-orienting the aperture converter with respect to the interferometer mainframe, based on the angular misalignment measurement, to align the aperture converter on the interferometer mainframe with the spindle axis, and in combination with the other recited limitations of claim 32. Claim 33 is allowed by the virtue of dependency on the allowed claim 32.

Regarding claim 34, the prior art fails to disclose or make obvious a method for aligning an interferometer aperture converter to a mechanical positioning system having a spindle axis having the steps of placing a corner cube having a measurable front surface on the spindle; using the interferometer to measure angular misalignment between the spindle axis and interferometer with aperture converter attached; and re-orienting the aperture converter with respect to the interferometer mainframe, based on the angular misalignment measurement, to align the aperture converter on the interferometer mainframe with the spindle axis, and in combination with the

other recited limitations of claim 34. Claim 35 is allowed by the virtue of dependency on the allowed claim 34.

Regarding claim 36, the prior art fails to disclose or make obvious a method for aligning a transmission sphere to an interferometer with partial coherence having the steps of introducing misalignment interference fringes with a distinct center, such as would be observed by moving the test part along the axis of the interferometer; changing the focus position of the interferometer as necessary to observe a modulation envelope over the interference fringes; and adjusting the tip/tilt of the transmission sphere to make the modulation envelope pattern and the fringe pattern concentric, and in combination with the other recited limitations of claim 36.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael P. Stafira whose telephone number is 571-272-2430. The examiner can normally be reached on 4/10 Schedule Mon.-Thurs..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Toatley can be reached on 571-272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Michael P. Stafira
Primary Examiner
Art Unit 2877

October 18, 2006